

Infertility Service Use among Fertility-Impaired Women in the United States: 1995-2010

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Short Abstract (word count=149)

Although Assisted Reproductive Technology (ART) represents a very small proportion of overall infertility service use in the U.S., it drives much of the public's perception about access to and use of medical services to have a child. We examine trends and individual-level correlates for use of medical services to have a child, using data from the 1995, 2002, and 2006-10 National Surveys of Family Growth (NSFG), each a nationally representative, cross-sectional survey of women 15-44 years of age. The analysis sample is comprised of NSFG female respondents with either infertility or impaired fecundity at time of interview. Our outcome measures are ever having used any infertility services and highest level of services used. We extend prior analyses showing that infertility service use remains closely tied to socioeconomic factors, and the threshold effect of these factors has shifted further upward towards the receipt of more costly services such as ART.

Extended Abstract

INTRODUCTION

The percentage of women aged 15-44 who have ever used infertility services increased from 9 percent in 1982 to 15 percent in 1995, then in 2002 declined to 12 percent, and remained at that level in 2006-10, based on data from the National Survey of Family Growth (NSFG) (1, 2, NSFG key stats webpage). In addition to this decline in the percentage of women ever using infertility services between 1995 and 2006-10, there was a reduction in the absolute numbers of women who reported using any infertility services. In 2006-10, 7.4 million women 15-44 in the United States reported having ever used infertility services, compared with 9.3 million women based on the 1995 survey.

To better understand the dynamics of this reported decline in the overall use of infertility services, this paper takes a closer look at the 1995, 2002, and 2006-10 data to highlight the types of services used and to determine the characteristics of women using specific types of infertility services. Numerous previous analyses have shown that women who make use of medical help for fertility problems are a highly selective group among those who have fertility problems. Data from nationally representative surveys--as well as from clinical studies--have shown that women who use infertility services are significantly more likely to be married, older, more highly educated, and more affluent (2-15). These characteristics of infertility service users may reflect the fact that women of lower socioeconomic status are less likely to have adequate health insurance coverage and other resources to afford the necessary diagnostic or treatment services.

This paper examines trends in ever-use of infertility services from 1995 to 2010 to detect overall patterns and correlates of infertility service use among women who

reported that they were experiencing some fertility problem. Given the trends towards increased use of any infertility service through the mid-1990s with a subsequent decrease in the past decade, we also investigate the extent to which socioeconomic factors may be related to the highest level of services ever used. Our approach of looking at the highest level of services, regardless of specific infertility diagnoses, has been used previously with 1988, 1995, and 2002 NSFG data (6, 9, 15). We extend those analyses by incorporating 2006-10 NSFG data and assessing whether there have been any shifts over time in the socioeconomic thresholds for higher, more costly levels of infertility services. That is, do factors that once affected ever-use of any infertility services now affect ever-use of higher level services? Our proposed analysis will illuminate changes in the composition of infertility patients and in the prevalence for specific infertility services, which in turn may have bearing on risk assessment associated with infertility treatment (16-21). Our findings may also help inform the discourse on issues of access and equity in this area of health care, as well as provide a backdrop for evaluating the impact of changes in health insurance coverage (22-27).

METHODS

Data source and analysis sample: This analysis is based on data from the 1995, 2002, and 2006-10 NSFG's, conducted by the National Center for Health Statistics. Each of these NSFG's is based on a multi-stage probability-based survey that is representative of the national household population of women 15-44 in the United States, and includes oversamples of Hispanics, Blacks, and those aged 15-24. Further details on the methodology and design of the NSFG have been published elsewhere (28). All analyses

presented in our paper are based on weighted data, using the fully adjusted, post-stratified case weights, and variances are estimated using SAS version 9.2 Survey procedures to account for the complex survey design features of the NSFG (www.sas.com).

In keeping with methods used in earlier NSFG-based studies of infertility services, we base this analysis on women aged 22-44 with current fertility problems at the time of the survey. Using age 22 as a lower bound reasonably allows for all individuals in the analysis to have potentially completed college, and improves the reliability of reports of two key variables in this analysis -- household income and fertility impairment. Women with current fertility problems at time of interview are those who are either infertile or have impaired fecundity, the two measures defined in the NSFG for fertility problems. These women are referred to in this analysis as women with current fertility problems or as “fertility-impaired” women.

Definitions of NSFG’s measures for fertility problems: The NSFG defines 12-month infertility for married or cohabiting women only, and the condition is assigned on the basis of detailed information on their pregnancies, contraceptive use, and sexual relationship dates. Women classified as having 12-month infertility at the time of the survey must have had at least 12 consecutive months prior to interview with unprotected intercourse with their husband or partner, and no conceptions in that time frame. Impaired fecundity, the second NSFG-based measure of fertility problems and also defined at the time of the survey, is defined for all women regardless of relationship status, and includes problems with pregnancy loss as well as with conception. The three subgroups of impaired fecundity include: nonsurgical sterility (physically impossible to conceive or carry to term), subfecundity (physically difficult or dangerous, but not

impossible to conceive or carry to term), and long interval without conception (36-month infertility). It should be noted that married or cohabiting women report about problems encountered by either member of the couple, and a woman can be classified as having impaired fecundity solely on the basis of her husband's or partner's fertility problems. Single, non-cohabiting women can only report about their own impaired fecundity. Trends for these two separate measures of fertility problems have been published (1-3, 29). The groups with 12-month infertility and impaired fecundity overlap to some extent, but combining the two groups into one analysis sample of women with "current fertility problems" is most appropriate for capturing the population most likely to make use of infertility services.

The unweighted sample sizes of fertility-impaired women aged 22-44 were 1,091 in 1995, 914 in 2002, and 1,281 in 2006-10, resulting in a total analysis sample of 3,286 women. These unweighted numbers of fertility-impaired women aged 22-44 represent the following weighted numbers in the household population: 6.0 million in 1995, 7.1 million in 2002, and 6.5 million in 2006-10.

Plan for analysis: We will conduct analyses for all fertility-impaired women 22-44 and then separately for those who are nulliparous. We will first look at ever-use of any infertility service among these 2 groups, and then at their highest level of services used, by key correlates of fertility problems and service use. Based on bivariate associations, variables will be chosen for logistic regression modeling (binary for "ever use of services" and multinomial for "highest level of services"). In past analyses, 1995 and 2002 NSFG data were pooled to assess the net effect of survey year on these outcome variables after controlling for compositional changes in the fertility-impaired population.

However, with the significant widening of the year span by including 2006-10 data, interpretation of pooled data may be less clear-cut. We may instead examine models stratified by survey year to determine if the net effect of key correlates has changed over time.

The assignment of “highest level of services” is made hierarchically, using the following sequence of mutually exclusive categories (shown below from highest to lowest). (Note that women could report as many types of service as they ever used, but they are coded on the basis of their highest level.)

- 1) assisted reproductive technologies (ART), artificial insemination (including intrauterine or intracervical insemination), or surgery for blocked tubes, endometriosis, fibroids, etc.;
- 2) ovulation drugs (without any ART or insemination component) or miscarriage prevention services;
- 3) advice or infertility testing only;
- 4) no infertility services ever used.

Strengths and limitations of the analysis: The primary strength of this analysis is that it is based on a large, nationally representative data source that is not limited to certain forms of infertility services or diagnostic groups, as would be the case with infertility clinic-based studies or those based solely on ART procedures. As has been noted in ART surveillance reports, the ART registry provides only numbers of such procedures in a given year, and not the number of women or couples who undergo them (30-32). Also, the consistency of questions across years of the NSFG, with regard to our outcomes and independent variables, allows us to make more robust comparisons of service use over time and across sub-populations most likely to use services. The NSFG is however limited in its age range; women and their spouses/partners use services and have children beyond the age of 44. Also, the NSFG’s cross-sectional design and limited

detail on service use the NSFG makes it difficult to establish temporal sequencing of specific service use and births that may result.

PRELIMINARY RESULTS

Table 1 shows the population percentages having ever used infertility services among all fertility-impaired women aged 22-44 in 1995, 2002, and 2006-10, and among those who were nulliparous at the time of the survey, that is, women experiencing fertility problems having a first child. Our final paper will discuss this table in more detail, but at this time we highlight some key findings. For all women and nulliparous fertility-impaired women, they are more likely to have used infertility services if they are currently married, have household incomes 300% or higher of poverty level, and have had private health insurance in the last 12 months. Our full analysis will examine these trends more closely, as well as highlight why race/ethnicity and the education variables in general are not statistically significant for nulliparous women.

Table 2 highlights the absolute numbers and the population-based percentages of fertility-impaired women reporting specific types of infertility services, documenting the small proportion who had ART relative to other services. We note three trends in the table that we will be investigating in detail. The first is that surgery or treatment for blocked tubes has decreased from 7.4% in 1995 to 2.9% in 2006-10. This may be due to earlier detection of chlamydia and a lower prevalence of pelvic inflammatory disease (PID), which can lead to blocked tubes. The second trend is the increase in use of assisted reproductive technology from 0.8% in 1995 to 2.7% in 2006-10. Although ART remains a small percentage of infertility service use among fertility-impaired women, the

increase may reflect more options that are available to patients and higher success rates of the various techniques, and possibly more insurance coverage of ART. The third pattern is that medical help to prevent miscarriage has decreased from 19% in 1995 to 12% in 2006-10. At this time we are uncertain of any reason for this decline, but we find it notable and will examine the data further.

Table 3 compares the highest level of services, based on 1995 and 2006-10 data, and finds similar differentials based on indicators of socioeconomic status as the ever-use measure shown in table 1. Roughly 9% of fertility-impaired women aged 22-44 in 2006-10 had used services in the “highest” category of ART, insemination, or surgery, and twice that many (18%) had used either ovulation drugs or medical help to prevent miscarriage, deemed midlevel in terms of complexity and cost. In 2006-10, the percentage using ART, insemination, or surgery was highest among nulliparous, fertility-impaired women aged 35-39, while in 1995, it was their counterparts aged 40-44. This shift likely reflects the much higher success rates of ART for women under the age of 40 and that fertility-impaired women are seeking the services earlier in the reproductive years. Our full paper will examine these and other patterns in more detail.

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Table 1. Percentage of women with current fertility problems who have ever used infertility services among those aged 22-44, and those nulliparous aged 22-44: United States, 1995-2010

	Women 22-44			Nulliparous women 22-44		
Characteristic	1995	2002	2006--2010	1995	2002	2006-2010
Unweighted sample n's	1091	914	1281	392	347	500
Weighted population size (millions)	6.0	7.1	6.5	2.5	2.6	2.7
Total /1	44.5	38.5	39.0	43.0	44.4	35.8
Age at interview						
22-29	36.6*	24.6*	27.1*	See below under parity and age		
30-34	44.2	46.7	45.5			
35-39	48.1	45.3	54.2			
40-44	50.8	39.7	35.0			
Parity (Number of live births)						
0 births	43.0	44.4*	35.8*	---	---	---
1 birth	50.0	45.7	46.3	---	---	---
2 or more births	41.9	26.1	36.5	---	---	---
Parity and age						
0 births, 22-29	29.7*	27.2*	24.4*	---	---	---
0 births, 30-34	44.9	59.1	47.4	---	---	---
0 births, 35-39	54.0	41.9	49.1	---	---	---
0 births, 40-44	48.9	56.8	39.4	---	---	---
1+ births, 22-29	43.2	22.0	30.2	---	---	---
1+ births, 30-34	43.7	39.8	44.7	---	---	---
1+ births, 35-39	43.7	46.8	56.6	---	---	---
1+ births, 40-44	51.6	32.4	32.3	---	---	---
Formal marital status						
Currently married	52.2*	45.0*	54.9*	57.6*	57.1*	54.9*
Formerly married	42.2	38.1	32.8	46.9	54.2	36.7
Never married	16.3	16.6	14.4	10.8	17.9	14.5
Intend to have a(nother) child						
Yes	46.3	43.0^	47.8*	42.9	44.2	43.1*
No or don't know	43.5	35.3	31.5	43.1	44.7	27.0
Education						
Not a college graduate	41.2*	34.6*	31.1*	42.2	43.4	31..3^
College graduate or higher	56.0	49.1	56.6	45.4	46.4	43.4
Household income						
<300% of poverty	35.7*	28.9*	30.2*	34.4*	33.0*	27.8*

>=300% of poverty	52.9	49.6	51.5	48.1	53.7	41.8
Private health insurance in last 12 mos						
Yes	49.3*	45.5*	47.0*	46.2*	49.3*	38.9^
No	29.9	24.1	24.9	30.5	28.8	27.5
Race/Hispanic origin						
Hispanic	37.8*	30.2*	39.2*	29.7#	50.6	45.8
non-Hispanic White	48.2	42.3	41.5	43.0	44.7	33.0
non-Hispanic Black	33.6	29.6	25.0	44.7	43.1	37.3
/1 Total includes those of other or unstated race/Hispanic origin groups, not shown separately due to small numbers.						
* Indicates a statistically significant association for that survey year between the characteristic and ever-use of infertility services. The asterisk appears only on the first category of each variable, but represents a chi-square p-value < 0.05. ^ indicates p-value < 0.10						
All characteristics represent the time of interview, unless otherwise specified. --- Category not applicable						
Source: CDC/NCHS, National Survey of Family Growth						

Table 2. Number (in millions) and percentage of women 22-44 with current fertility problems who have ever used infertility services, by type of service, United States, 1995 and 2002

Infertility Services	Women aged 22-44					
	Number in millions			Percent		
	1995	2002	2006-10	1995	2002	2006-10
TOTAL	2.7	2.7	2.5	44.5	38.5	39.0
Medical help to get pregnant	2.1	2.3	2.2	35.2	32.0	34.3
Advice	1.7	1.8	1.7	27.5	25.1	26.9
Infertility testing (male or female)	1.4	1.5	1.6	23.1	21.5	25.3
Female testing	1.3	1.4	1.5	21.2	19.9	23.9
Male testing	1.0	1.1	1.2	16.8	16.0	19.2
Ovulation drugs	1.0	1.2	1.2	16.1	16.2	18.3
Surgery or treatment for blocked tubes	0.5	0.3	0.2	7.4	3.6	2.9
Artificial insemination (including intrauterine)	0.4	0.4	0.4	5.9	6.1	6.6
Assisted reproductive technology	0.1	0.1	0.2	0.8	1.1	2.7
Medical help to prevent miscarriage	1.2	0.9	0.8	19.2	12.9	12.1

Note: Percentages across services in a given survey year do not add to 100 because women could report as many services as they ever had.
Source: CDC/NCHS, National Survey of Family Growth

Table 3. Percentage distribution of women aged 22-44 with current fertility problems by highest level of infertility services used, according to selected characteristics: United States, 1995 and 2006-2010

Characteristic	1995				2006-2010			
	No infertility services	Advice/Testing	Ovulation/Miscarriage Services	ART/Insemination/Surgery	No infertility services	Advice/Testing	Ovulation/Miscarriage Services	ART/Insemination/Surge
TOTAL 1/	55.5	10.4	22.3	11.8	61.0	11.2	18.4	9.4
Parity and age								
0 births, 22-29	70.3*	10.8	11.7	7.2	75.6	13.2	9.2	2.0
0 births, 30-34	55.1	14.5	17.7	12.6	52.6	24.9	18.0	4.5
0 births, 35-39	46.0	16.1	19.4	18.5	50.9	10.0	19.5	19.6
0 births, 40-44	51.1	16.5	5.4	26.9	60.6	10.5	15.9	13.0
>=1 births, 22-29	56.8	6.2	31.1	6.0	69.8	9.3	19.7	1.1
>=1 births, 30-34	56.3	6.6	30.3	6.8	55.3	6.2	26.1	12.3
>=1 births, 35-39	56.3	7.8	23.3	12.7	43.4	16.8	24.3	15.4
>=1 births, 40-44	48.4	10.8	27.2	13.6	67.8	3.5	16.2	12.5
Education								
Not a college graduate	58.8*	10.4	21.1	9.8	68.7	9.4	16.3	5.6
College graduate or higher	44.0	10.5	26.5	18.9	43.4	15.3	23.2	18.1
Private health insurance in last 12 mos								
Yes	50.7*	10.7	24.3	14.3	53.0	13.7	20.0	13.3
No	70.1	9.6	16.3	4.0	75.1	6.7	15.7	2.5
Race/Hispanic origin								
Hispanic	62.2*	6.4	26.9	4.6	60.9	20.0	15.5	3.7
Non-Hispanic White	51.8	11.0	23.7	13.7	58.5	10.3	20.4	10.7
Non-Hispanic Black	66.4	9.9	16.5	7.3	75.0	7.4	13.3	4.3

Percentage distributions may not add to 100 due to rounding. All characteristics represent the time of interview, unless otherwise specified.

Source: CDC/NCHS, National Survey of Family Growth.

/1 Total includes those of other or unstated race/Hispanic origin groups, not shown separately due to small numbers.